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Teaching Cryogenics Using Community Resources

ARNOLD LINDAMAN

Pleasant Valley

What! Resources!?!

Securing beef eyes and hearts from a butcher shop, obtaining white rats from the Quad Cities Dairy Council,



Lindaman

annual tours of a generating plant, regular fossil hunts at a limestone quarry, tours of the geology museum at Augustana College, judging of our Why "X" Science Fair by community personnel, visitation by a local doctor on the dangers of smoking and lung cancer, glass blowing by an individual from a local advertising agency, as well as our prize visit on cryogenics with Mr. Edwin M. Vaughan from the Research Office of the U.S. Army Weapons Command, all attest to the wide but selective use of community resources in our intermediate science program at the Riverdale Intermediate School, The School Township of Pleasant Valley, Pleasant Valley, Iowa.

John Dewey once suggested that education fling open the classroom windows and let in the world. How does one selectively fling open the doors and utilize community resources?

Does The Resource Fit?

To answer this question, let a teacher cite Mr. Vaughan's visit from the Rock Island Arsenal. Our cooperative teaching arrangement permits the students to benefit from a home-room as well as a special science teacher. Under this organization, three fifth grade classes had been studying a unit on heat energy for about eight weeks prior to Mr. Vaughan's visit. Included in the unit were a discussion of the jet engine and the Diesel engine, and a series of eight experimental stations, each confronting the students with experiences in convection, conduction, and radiation. Mid-way through the unit, the science teachers worked on a lesson to further stimulate thinking by polling the students to elicit their definitions of heat and temperature. Next, we asked the students to tell which had the higher temperature, a cup of boiling water or Lake Superior. After concluding that the cup would have the higher temperature, we asked which "container" held the greater amount of heat. Research reading followed. We finally agreed that heat tells us about the number of molecules vibrating whereas, the term temperature tells us how fast the molecules are vibrating.

The final visit of the community resource person to our science classroom was made when the students began to question whether or not ice in Lake Superior would have heat. Further questions concerning dry ice, and how cold one could get something set the stage for Mr. Vaughan's third visit

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to our fifth grade classes. The knowledge and technical skill of Mr. Vaughan as well as the equipment from the Bendix Corporation made possible an introductory and enriching lesson with liquid nitrogen (about 300° below zero on the Kelvin scale) in the field of cryogenics.

A steam engine running with liquid nitrogen, a balloon contracting and inflating depending on its surrounding temperature, and Mr. Vaughan explaining the presence of frost on the flask containing the liquid nitrogen were a few of the experiences available to our classes. The latter situation is shown in the picture. Incidentally, the goose necked lamp in the background helped in understanding radiation from a light bulb.

What Can You Do For The Resource?

The classroom teacher should provide the resource with the following information when setting up a program:

- a. Give the age of the group of grade level.
- b. State the amount of time that can be devoted to the presentation.
- c. Give some background information as to what the children studied and may already know about the subject.
- d. Give suggestions for specific points

that may be stressed during the presentation such as definitions of certain key terms.

- e. Give directions to the school.

It must be said that utilizing community resource personnel involves a two way communication. This mutual exchange is the most crucial step in effectively utilizing these resources. The classroom teacher should secure the following information from the resource person prior to the visit:

- a. Time of arrival at the school for the program.
- b. Needed physical requirements such as screens, projectors, tables, beakers, etc.

What Are The Benefits?

Benefits resulting from a use of community resources are highly individualized. One cannot analyze the transactions taking place among students, resource speaker, and the classroom teacher. All affect each other.

Our students met a real scientist. They saw an application of facts and concepts which they themselves had been learning. The teachers had another common experience to build from and to refer to in the future. Resource personnel, as Mr. Vaughan, take with them a greater awareness of the learning process and a sense of satisfaction for having had a part in that process.

Association of Midwest College Biology Teachers . . .

The AMCBT will hold its Annual Meeting at Cape Girardeau, Missouri on October 7 and 8. Always informative and instructive, the AMCBT is composed of biologists in the Midwest, from Indiana to the Dakotas. The organization was formed in 1959, and since that time has grown every year. Dr. Leland Johnson of Drake University was the first president of AMCBT (Dr. Johnson is current past president of the Iowa Academy of Science). Biologists and biology instructors from Junior Colleges as well as from 4-year schools are welcome to attend the AMCBT meetings. Iowa is always well-represented at their meetings, and several Iowans serve on committees of the Association of Midwest College Biology Teachers.